

Patent
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
PERSSON, M. et al.	:	
	:	Docket: ANO 6119P1US/3156
Serial No.: Unassigned	:	
Filing Date: Even Date Herewith	:	
Priority Patent Int'l Appln. No.: PCT/SE00/00821	:	Examiner:
European Patent Application No.: 99850074.8	:	
US Provisional Patent Application No.: 60/132,359	:	
Priority Date: May 4, 1999	:	Group Art Unit:
	:	
For: SILICA-BASED SOLS	:	

BOX PATENT APPLICATION
Assistant Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Preliminary to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, line 1,

Silica-based sols

This application is a continuation of PCT/SE00/00821, filed April 28, 2000, which claims priority of European Patent Application No. 99850074.8, filed May 4, 1999, U.S. Provisional Patent Application No. 60/132,359, filed May 4, 1999, Swedish Patent Application No. 9901687-5, filed May 6, 1999, European Patent Application No. 99850160.5, filed October 29, 1999 and U.S. Provisional Patent Application No. 60/162,445, filed October 29, 1999.

IN THE CLAIMS:

Please amend claim 1 as follows, cancel claims 2-21 without prejudice and add new claims 22-40:

1. (Amended) An aqueous sol containing silica-based particles, which sol has:

- (i) an S-value within the range of from 10 to 45%;
- (ii) a viscosity within the range of from 5 to 40 cP; and
- (iii) a molar ratio of SiO_2 to M_2O , where M is alkali metal or ammonium, within the range of from 10:1 to 40:1; and
- (iv) the silica-based particles have a specific surface area within the range of from 550 to 725 m^2/g .

22. (New) The aqueous sol according to claim 1, wherein the S-value is within the range of from 20 to 40%.

23. (New) The aqueous sol according to claim 1, wherein the sol has a molar ratio of SiO_2 to M_2O , where M is alkali metal or ammonium, within the range of from 15:1 to 30:1.

24. (New) The aqueous sol according to claim 1, wherein the sol has pH of at least 10.6.

25. (New) The aqueous sol according to claim 1, wherein the sol has a viscosity within the range of from 7 to 25 cP.

26. (New) The aqueous sol according to claim 1, wherein the sol has a molar ratio of Al_2O_3 to SiO_2 within the range of from 1:4 to 1:1500.

27. (New) The aqueous sol according to claim 1, wherein the sol has a molar ratio of B, where B is boron, to SiO_2 within the range of from 1:4 to 1:1500.

28. (New) The aqueous sol according to claim 1, wherein the sol has a molar ratio of Al to B, where B is boron, within the range of from 100:1 to 1:100.

29. (New) An aqueous sol containing silica-based particles, which sol has:

- (i) an S-value within the range of from 10 to 45%;
- (ii) a viscosity within the range of from 5 to 40 cP; and
- (iii) a silica content of at least 10% by weight; and
- (iv) the silica-based particles have a specific surface area within the range of from 550 to 725 m²/g.

30. (New) The aqueous sol according to claim 29, wherein the S-value is within the range of from 20 to 40%.

31. (New) The aqueous sol according to claim 29, wherein the sol has a pH of at least 10.6.

32. (New) The aqueous sol according to claim 29, wherein the sol has a silica content within the range of from 12 to 20% by weight.

33. (New) The aqueous sol according to claim 29, wherein the sol has a viscosity within the range of from 7 to 25 cP.

34. (New) The aqueous sol according to claim 29, wherein the sol has a molar ratio of SiO₂ to M₂O, where M is alkali metal or ammonium, within the range of from 10:1 to 40:1.

35. (New) An aqueous sol containing silica-based particles, which sol has:

- (i) an S-value within the range of from 10 to 45%;
- (ii) a viscosity within the range of from 7 to 25 cP;
- (iii) a silica content of at least 10% by weight;

- (iv) a molar ratio of SiO_2 to M_2O , where M is alkali metal or ammonium, within the range of from 10:1 to 40:1; and
- (v) a pH of at least 10.6.

36. (New) The aqueous sol according to claim 35, wherein the silica-based particles have a specific surface area of at least $300\text{m}^2/\text{g}$ up to $1050\text{ m}^2/\text{g}$.

37. (New) The aqueous sol according to claim 35, wherein the silica-based particles have a specific surface area within the range of from 775 to $1050\text{ m}^2/\text{g}$.

38. (New) The aqueous sol according to claim 35, wherein the silica-based particles have a specific surface area within the range of from 550 to $725\text{ m}^2/\text{g}$.

39. (New) An aqueous sol containing silica-based particles, which sol has:
- (i) an S-value within the range of from 10 to 45%;
 - (ii) a viscosity within the range of from 5 to 40 cP;
 - (iii) a silica content of at least 10% by weight;
 - (iv) a molar ratio of SiO_2 to M_2O , where M being alkali metal or ammonium, within the range of from 10:1 to 40:1; and
 - (v) the sol is modified by an aluminium-containing compound, a boron-containing compound or a mixture thereof.

40. (New) The aqueous sol according to claim 39, wherein the silica-based particles have a specific surface area of at least $300\text{m}^2/\text{g}$ up to $1050\text{ m}^2/\text{g}$.

IN THE ABSTRACT:

Please add the following abstract on a separate page following the claims:

Abstract of the Disclosure

An aqueous sol containing silica-based particles which has an S-value within the range of from 10 to 45%, a viscosity within the range of from 5 to 40 cP, and a molar ratio of SiO_2 to M_2O , where M is alkali metal or ammonium, within the range of from

10:1 to 40:1, or a silica content of at least 10% by weight. The invention further relates to a process for the production of silica-based particles comprising the steps of: (a) acidifying an aqueous silicate solution to a pH of from 1 to 4 to form an acid sol; (b) alkalising the acid sol at an SiO₂ content within the range of from 4.5 to 8% by weight to; (c) allowing particle growth of the alkalised sol for at least 10 minutes, or heat-treating the alkalised sol at a temperature of at least 30°C; and then (d) alkalising the obtained sol to a pH of at least 10.0. The invention further relates to silica-based particles obtainable by the process, the use of the silica-based particles as drainage and retention aids in the production of paper as well as a process for the production of paper from an aqueous suspension containing cellulosic fibres, and optional filler, in which silica-based particles and at least one charged organic polymer are added to the cellulosic suspension.

Remarks

This preliminary amendment amends the specification, claims and abstract, and adds new claims without the addition of new matter thereby. A marked version showing the amendments is attached hereto. Presently, claims 1 and 22-40 are pending.

Early and favorable consideration of this application is respectfully requested.

Respectfully submitted,



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MARKED VERSIONIN THE SPECIFICATION:

Page 1, after line 1 (the title), insert, - - This application is a continuation of PCT/SE00/00821, filed April 28, 2000, which claims priority of European Patent Application No. 99850074.8, filed May 4, 1999, U.S. Provisional Patent Application No. 60/132,359, filed May 4, 1999, Swedish Patent Application No. 9901687-5, filed May 6, 1999, European Patent Application No. 99850160.5, filed October 29, 1999 and U.S. Provisional Patent Application No. 60/162,445, filed October 29, 1999.- -

IN THE CLAIMS:

Please amend claim 1 as follows, cancel claims 2-21 without prejudice and add new claims 22-40:

1. (Amended) [Aqueous] An aqueous sol containing silica-based particles, [characterized in that it has] which sol has:

- (i) an S-value within the range of from 10 to 45%[,];
- (ii) a viscosity within the range of from 5 to 40 cP; and
- (iii) a molar ratio of SiO₂ to M₂O, where M is alkali metal or ammonium, within the range of from 10:1 to 40:1; and
- (iv) the silica-based particles have a specific surface area within the range of from 550 to 725 m²/g.

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37. (New) The aqueous sol according to claim 35, wherein the silica-based particles have a specific surface area within the range of from 775 to $1050\text{m}^2/\text{g}$.

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IN THE ABSTRACT:

Please add the following abstract on a separate page following the claims:

- -Abstract of the Disclosure

An aqueous sol containing silica-based particles which has an S-value within the range of from 10 to 45%, a viscosity within the range of from 5 to 40 cP, and a molar ratio of SiO_2 to M_2O , where M is alkali metal or ammonium, within the range of from 10:1 to 40:1, or a silica content of at least 10% by weight. The invention further relates to a process for the production of silica-based particles comprising the steps of: (a) acidifying an aqueous silicate solution to a pH of from 1 to 4 to form an acid sol; (b) alkalising the acid sol at an SiO_2 content within the range of from 4.5 to 8% by weight to; (c) allowing particle growth of the alkalised sol for at least 10 minutes, or heat-treating the alkalised sol at a temperature of at least 30°C ; and then (d) alkalising the obtained sol to a pH of at least 10.0. The invention further relates to silica-based particles obtainable by the process, the use of the silica-based particles as drainage and retention aids in the production of paper as well as a process for the production of paper from an aqueous suspension containing cellulosic fibres, and optional filler, in which silica-based particles and at least one charged organic polymer are added to the cellulosic suspension.--